SAFE HARBOR AGREEMENT

FOR GILA TOPMINNOW (*Poeciliopsis occidentalis occidentalis*) AND DESERT PUPFISH (*Cyprinodon macularius*) ON STATE LANDS OWNED BY ARIZONA DEPARTMENT OF TRANSPORTATION (ADOT)

Prepared By:
Patricia Ann Sowka

for the
Arizona Department of Transportation
Natural Resources Section

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1.0 BACKGROUND

Once common throughout most of the Gila River Basin, Gila topminnow (*Poeciliopsis occidentalis occidentalis*) and desert pupfish (*Cyprinodon macularius*) now occur naturally in a fraction of their historic range (Minckley 1973) and both species are currently listed as endangered throughout their respective ranges in the United States of America (USFWS 1993, 1998). Habitat loss and alteration, and introduction of nonnative fishes, have contributed significantly to declines in natural populations of these two species (Minckley 1973; Bagley et al. 1991; Weedman 1998).

Recovery plans for both Gila topminnow and desert pupfish list reintroduction of these fish into suitable habitats within their historic ranges as recovery objectives or tasks (USFWS 1993, 1998). In addition, maintenance of backup genetic stocks and refugium populations is also indicated in both recovery plans. Both fish breed readily in almost any water that is lacking nonnative aquatic species. The location of natural and reintroduced populations of Gila topminnow and desert pupfish, along with life history information can be found in the recovery plans and Weedman and Young (1997).

2.0 PURPOSE AND NEED FOR ACTION

The purpose and need for this Safe Harbor Agreement (SHA) is to provide additional refugia for both species listed above, and to provide an effective means of mosquito control for the Arizona Department of Transportation (ADOT). The first site is in Tempe, Arizona. Past efforts by Arizona Game and Fish Department (AGFD), Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (Service) and the U.S. Forest Service (USFS) to reintroduce Gila topminnow into approximately 200 sites were met with "varying degrees of success," possibly due to poor site selection (Weedman and Young 1996). The report suggests that sites may have been chosen simply because they offered permanent water within the historical range for this species.

Recovery of topminnow and pupfish is limited by availability of suitable habitat. Permanent water sources, free of predaceous fishes and within the species' historic ranges, are necessary for successful establishment of topminnow and pupfish. Task 2 in the current desert pupfish recovery plan, states that "...efforts should be made to reestablish pupfish into a diversity of habitat types reflective of those occupied historically..." (USFWS 1993). Task 1.1 of the current draft revised recovery plan for Gila topminnow lists maintenance of refugia populations as a criterion for recovery of topminnow (Weedman 1998). Man-made habitats are specifically mentioned as a means of establishing refugia populations. Failure to use these habitats to recover topminnow and/or pupfish could actually result in the increased stocking and spread of nonnative, invasive fishes (i.e., mosquitofish) for mosquito control.

Another need, not related to recovery of endangered species, also exists: public health and safety. Every summer, ADOT receives complaints regarding mosquitoes from residents who live adjacent to the Kyrene Retention Basin. Permanent water in the bottom of the basin acts as a breeding ground for mosquitoes, which are known to be vectors for encephalitis. Although mosquitofish (*Gambusia affinis*) currently inhabit the channel running through the basin, they have not been effective at controlling the mosquitoes. Additional treatment methods, such as spraying of pesticides, have therefore been implemented at great expense.

Implementation of this Agreement would provide suitable habitat for establishing refugia populations of Gila topminnow and desert pupfish, provide opportunities for research, and provide much-needed mosquito control for nearby residential areas. Most important, this program would contribute to recovery (positive net conservation benefit) of both Gila topminnow and desert pupfish and potentially provide a more effective means of mosquito control, while reducing the risk of further spread of exotic species (i.e., mosquitofish) in Arizona.

This SHA is a voluntary agreement between ADOT and the Service and each party has the commitment and means to implement it.

3.0 GEOGRAPHIC SCOPE OF AGREEMENT

The scope of this Agreement is land in the state of Arizona controlled by ADOT, and occurring within the historic distributions of Gila topminnow and desert pupfish. Basins will be examined by ADOT to determine suitability of habitat. ADOT will consult with the Service (or other qualified individuals) to verify habitat suitability and determine suitability for stocking of topminnows and pupfish.

The first basin to be stocked is located in Maricopa County, Arizona, near the intersection of Baseline and Hardy Roads (T1N R4E). The basin is totally fenced and locked, and consists of about 14.83 ha (36.63 ac). Approximate area at the bottom of the basin is 3.95 ha (9.75 ac). Basin habitat consists of a perennial channel about 578 m^2 (6225 ft^2), vegetated primarily with Gooding willow (*Salix gooddingii*), coyote willow (*Salix exigua*), and cottonwood (*Populus fremontii*).

4.0 SPECIES AND HABITATS TO BE COVERED BY THIS AGREEMENT

4.1 SPECIES COVERED

Species to be covered under this Agreement are Gila topminnow (*Poeciliopsis occidentalis occidentalis*) and desert pupfish (*Cyprinodon macularius*). If data on species present in the retention basins demonstrate that additional threatened or endangered species are utilizing wetland habitat within the basin, this Agreement may be amended to include those species. ADOT is encouraging native vegetation in the basin which may result in additional species utilizing this habitat.

4.2 HABITAT COVERED

This SHA covers State Land controlled by ADOT, including, but not limited to, retention basins, water treatment facilities, springs, marshes, streams, and ponds. Both Gila topminnow and desert pupfish have historically occupied a variety of habitats. In general, their habitat consisted of relatively shallow water (<1 m in depth) along stream or river margins, ponds, cienegas, and springs (Minckley 1973, 1999; USFWS 1993, 1998). Both species are associated with aquatic or streamside vegetation, algal mats, organic debris, and both are adapted to environmental extremes (i.e., water salinity, water temperature, flooding, etc.)(Minckley 1999, Weedman 1998).

5.0 NET CONSERVATION BENEFIT

The items listed below are specific "tasks" in the recovery plans intended to lead to recovery and eventual downlisting of Gila topminnow and desert pupfish (USFWS 1993, Weedman 1998). A Level 1 (Tier 1) population is a natural population occupying historic habitat "and which were not known to have been placed in those habitats by humans" (USFWS 1993:33). Level 2 and Level 3 populations have been reintroduced by humans into habitat within historic range. Level 2 populations occur in natural habitats and should receive a high degree of protection and only require minor management to persist. Level 3 populations occur in highly modified or man-made habitats, and may require extensive management to maintain them (USFWS 1993, Weedman 1998).

Implementation of this Agreement will contribute to recovery of Gila topminnow and desert pupfish in the following ways:

- Provide refugia for Level 3 populations of Gila topminnow and desert pupfish which could act as a source of fish for reintroduction efforts.

- Provide sources of Level 3 topminnow and pupfish for use in genetic exchanges between Level 2 (topminnow only) or Level 3 (for both species) populations.

- Provide study sites for research related to life-history, genetics, ecology, habitat requirements, and interactions with nonnative aquatic species.

- Provide convenient sites for education and public relations related to endangered species recovery, conservation of limited resources, and ecology in general.

6.0 BASELINE CONDITIONS

At present, baselines for Gila topminnow and desert pupfish in the ADOT retention basin statewide are zero. No native fish occur in the basin. This proposal calls for Gila topminnow and desert pupfish to be introduced, or stocked, into the Baseline and Hardy Road retention basin. As additional basins are identified for possible stocking, these basins will be surveyed to determine baseline conditions. Baseline conditions will be determined and agreed to in writing by both parties.

In nature, populations of Gila topminnow expanded in size and geographic range during wetter periods (when habitats were connected). These populations subsequently contracted and often disappeared during times of drought (Weedman 1998, Minckley 1999). Due to high reproductive potential and an adaptation to environmental extremes, numbers of individuals of both species will likely fluctuate over time after being introduced into the retention basin(s).

7.0 INCIDENTAL TAKE ASSOCIATED WITH MANAGEMENT ACTIONS

Safe Harbor Agreements are written in anticipation of "take" of listed species at some point in the future. Measures will be implemented to prevent or reduce levels of "take"; however, incidental take of both Gila topminnow and desert pupfish could result from a variety of management actions associated with regular maintenance of ADOT retention basins. Management actions which may result in incidental take are listed in section 7.1 below.

7.1 METHODS OF TAKE

The following is a list of activities which could result in incidental take:

1. Earthwork around basins;
2. Removal of nonnative vegetation in basin;
3. Controlled burns and/or mowing to limit the extent of emergent vegetation in and around the basin (will not be performed in main channel area);
4. Contamination of water inflow due to contaminated run-off from roadways;
5. Contamination of water in channel during pesticide application (applied to nonnative vegetation or mosquito larvae);
6. Interruption of water inflow, either intentionally by ADOT or unintentionally due to extenuating circumstances, resulting in partial or complete drying of the channel;
7. Management actions to remove nonnative aquatic species;
8. Monitoring of topminnow and pupfish populations in basin;
9. Use of basin as "living laboratory" by students, faculty or other authorized individuals;
10. Take incurred during annual trash clean-ups at retention basins; and

11. Loss of individuals due to operation of automatic pump (pump turns on when water level in basin reaches a specific level).

In addition to the activities listed above (Items 1-10), factors beyond ADOT's control could result in take of topminnow and/or pupfish. Examples of extenuating factors include, but are not limited to: invasion by nonnative species such as nonnative fishes, bullfrogs (*Rana catesbeiana*), etc., predation by native wildlife, interruption of water inflow resulting in complete drying of the stream channel, fire, drought, and flooding.

Efforts to salvage topminnow and pupfish will be initiated as soon as possible in the event that any of the above-mentioned activities occur. Any loss of the populations due to such disturbances may require supplemental stocking of topminnow and/or pupfish. ADOT will consult with the Service and AGFD to determine the appropriate source population for supplemental stockings.

7.2 EXTENT OF TAKE

The first seven actions listed in section 7.1 above, could result in complete (100%) take of both Gila topminnow and desert pupfish in the retention basin. It should be noted, however, that none of those activities is expected to result in complete take due to minimization and mitigation. As mentioned earlier, mosquitofish have been existing in the basin for over four years without serious impacts from ADOT's management activities.

The next four management actions (Items 8-11 in section 7.1) are not expected to result in complete (100%) take of either species. Isolated individuals could be "taken" during these routine activities. Care would be taken to reduce the possibility and frequency of take during these activities. Take due to management action number 11 above is unlikely. The pump is rarely used, it does take water from the bottom of the basin, and it is at the opposite end of the aquatic habitat.

Finally, predation by nonnative fishes is unlikely to occur due to the protected nature of this basin. The possibility of invasion by other nonnative species (i.e., crayfish or bullfrogs) does exist, however, and could result in partial or complete take of both topminnow and pupfish. Take by birds or other animals inhabiting the basin is more difficult to ascertain. Partial take, as is often observed in nature, can be expected to occur.

7.3 IMPACTS LIKELY TO OCCUR AS A RESULT OF TAKE

While loss of individuals, or even entire populations of topminnow and pupfish in the basin(s) is possible, no impact on natural or reintroduced populations outside the basin is expected. Fish stocked in the retention basin would be "surplus" or "back-up" fish, so loss of the populations would have no significant negative impact on the overall recovery of either species.

7.4 MEASURES TO MONITOR, MINIMIZE, AND MITIGATE NEGATIVE IMPACTS

Management actions such as major earthwork, removal of nonnative vegetation, pesticide application, and other management activities will be scheduled in advance, and notification of such activities provided to the Natural Resources Section of ADOT. Activities which are expected to result in major siltation or contamination of the channel can be delayed until the fish can be safely removed from the channel and temporarily housed in aquaria, fish farms (i.e., circular holding tanks)(Soderberg et al. 1993), or small wading pools (Minckley, pers. comm., 1999). If activities are going to require long-term removal of fish, arrangements can be made to house them at alternative locations or release them elsewhere.

Actions such as annual trash clean-ups, research, and planting of native vegetation aren't expected to result in significant take and can be minimized and mitigated by taking extreme care while performing these activities. Students, volunteers, and staff working in or around the channel will be supervised at all times by an ADOT employee, and instruction on proper safeguards will be provided to all personnel prior to initiating work in or around the channel.

8.0 NOTIFICATION REQUIREMENT

ADOT will make reasonable attempts to notify the Service in advance of major actions which could result in substantial take of topminnow or pupfish to allow the Service or another appropriate party access to collect and relocate individuals if warranted.

9.0 RESPONSIBLE PARTIES

Arizona Department of Transportation (ADOT): responsible for providing project site(s), arranging for removal of nonnative fishes prior to stocking topminnow and pupfish, annual monitoring and reporting of status of topminnow and pupfish populations to the Service, notifying the Service prior to performing major renovations in the basin(s) or initiating actions in the basin(s) which may result in major take, and arranging for return of fish at the conclusion of the 10-year Agreement (if not renewed).

U.S. Fish and Wildlife Service (Service): providing advice and scientific expertise during the project, responsible for providing appropriate permits with assurances, and providing Gila topminnow and desert pupfish (or arranging for appropriate genetic stock to be provided to ADOT via another agent, such as AGFD).

10.0 RESPECTIVE RESPONSIBILITIES OF THE PARTIES

In addition to the specific tasks and contributions to this effort as identified in the above section titled "Responsible Parties," the parties further agree as follows:

10.1 THE SERVICE:

1. Does not assume jurisdiction over the premises by this Agreement. The Service assumes no liability for damage except that resulting from its own negligence on this property.

2. Will not be held liable in any way to restore the property to its prior condition upon termination or expiration of this Agreement.

3. Agrees to provide technical advice and assistance in obtaining permits that may be required for ADOT to fulfill the terms of this Agreement. A state permit will be required.

10.2 ADOT:

1. Retains all rights to control trespass and access, and retains all responsibility for taxes, assessments, and damage claims.

2. Guarantees ownership of the above-described land and warrants that there are no outstanding rights which interfere with this wildlife management Agreement. A change of ownership shall not change the terms of this Agreement which shall remain in effect on the described property for the duration of the period specified in Section 14.0 below. ADOT agrees to notify the Service of planned or pending changes of ownership at least 30 days in advance.

3. Agrees to allow the Service (its members, agents, or assignees) access to the project site, upon prior, reasonable, notification by the Service, for wildlife habitat development and management purposes and to inspect work completed. All Service members, agents, and assignees will be in uniform or will have proper identification as government employees or agents.

4. Agrees to provide a Taxpayer Identification Number to the Service. Taxpayer Identification Number (TIN), means the number required by the IRS to be used in reporting income tax and other returns. For most individuals, this is the Social Security Number. The Service is required to obtain this information to process any payment(s) to ADOT as a result of this Agreement. This information will be furnished to the IRS as required by the Tax Reform Act of 1986 and may be shared with the Department of Justice. Furnishing a Social Security Number is voluntary, but failure to do so may result in disqualification from this program.

5. Assumes responsibility for securing any permits or other authorizations needed to carry out the project.

11.0 ADMINISTRATIVE MATTERS

1. For matters applicable to this Agreement, the Service Point of Contact (POC) is the person whose name appears on the signature block below. No change to this Agreement shall be binding upon the Service or ADOT unless and until in writing and signed by both parties.

2. Pursuant to Section 22, Title 41, United States Code, it is further mutually agreed that no member of or delegate to Congress or resident commissioner, after their election or appointment, and either before or after they have qualified and during his continuance in office, shall be admitted to any share or part of this Agreement, or to any benefit to arise thereupon; but this provision shall not be construed to extend to this Agreement if made with a corporation for its general benefit.

3. This Agreement may be modified at any time by mutual written consent of all the parties.

12.0 MONITORING SCHEDULE

Monitoring of Gila topminnow and desert pupfish stocked into any ADOT retention basin will occur, at a minimum, on an annual basis. Monitoring will be conducted by ADOT Natural Resource Section, or by an agent on behalf of ADOT. ADOT will incur any expenses related to monitoring of populations stocked into ADOT retention basins.

Sampling of habitats will be conducted using standard protocols (i.e., dip nets and seines). Extirpated populations will be restocked if necessary, only after consultation with the Service and the AGFD.

13.0 DURATION OF AGREEMENT

This Agreement will commence effective the date signed by both parties and will continue for a term of 10 years. Prior to the date of expiration of this Agreement, this SHA may be renewed upon written Agreement by both parties.

14.0 TERMINATION PROVISIONS

This Agreement may be terminated by either party upon 30 days' advance written notice to the other party.

15.0 UNFORESEEN CIRCUMSTANCES AND AMENDMENT PROCEDURES

The Applicant agrees to meet annually or more frequently as necessary and agreed upon with the Service, to review progress in implementing the SHA and to review needs for project modifications due to changing circumstances. Any major change in land use or natural changes in the watershed that effect species of concern or their habitats should be reported by the Applicant in writing to the designated Service representative, or by that representative or other cooperators in writing to the Applicant as soon as possible.

It is necessary to establish a procedure for amending the Section 10(a)(1)(A) permit. Amendments must be evaluated by all cooperators based on the effects that proposed amendments have on the habitat, individual species, and permitted actions. The Service must be consulted on all proposed amendments. Concurrence through a consensus will be sought among cooperators before implementation of any amended action. It is understood that unforeseen circumstances will not require the Applicant to provide additional habitats and mitigation above that designated in this Agreement, nor provide additional compensations above that provided for in this Agreement, without consent of the Applicant.

Minor amendments involve routine administrative revisions or changes to the operation and management program that do not diminish the level or means of mitigation. Such minor amendments do not alter the terms of the Section 10(a)(1)(A) permit. On written request of the Applicant, the Service is authorized to approve minor amendments to this SHA, if the amendments do not conflict with the primary purpose of this SHA.

Under the current Safe Harbor policy the Service provides that additional mitigation or financial compensation shall not be required of the applicant or their successors beyond the level of mitigation provided in the SHA for the covered species. For the Applicant to be fully covered and for assurances to be provided under this SHA, all requirements identified in the SHA and its associated documents must be met, and the SHA must be properly implemented. If additional mitigation measures are subsequently deemed necessary to provide for the conservation of a species that was otherwise adequately covered under the terms of a properly functioning SHA, the obligation for such measures shall not rest with the SHA Permittee.

The Safe Harbor assurances policy does not apply if the SHA is not properly implemented, if additional species are listed or found to occur within the SHA area, or if unforeseen circumstances occur. The Service must demonstrate that unforeseen circumstances occur. If extraordinary circumstances warrant additional mitigation, such mitigation shall limit changes to the original SHA to the maximum extent possible and shall be limited to modifications within the SHA's operating conservation program for the affected species, and maintain the original terms of the SHA as much as possible. Nothing in the Safe Harbor assurances policy shall be construed to limit or constrain the Service or any other governmental entity from taking additional actions at its own expense to protect or conserve a species included in an SHA, subject to landowner approval.

16.0 SIGNATORIES

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Safe Harbor Agreement to be in effect as of the date last signed below.

APPLICANT, Arizona Department of Transportation

BY _____ Date _____

Clif Taylor, Natural Resources Manager III
Arizona Department of Transportation
Phoenix, Arizona

BY _____ Date _____

Nancy Kaufman, Regional Director
United States Fish and Wildlife Service
Albuquerque, New Mexico

17.0 ACKNOWLEDGMENTS

The author would like to thank Doug Duncan (Service), Leslie Dierauf (Service) and Doug Brown (ADOT) for comments provided during preparation of this Agreement.

18.0 REFERENCES CITED

Bagley, B. E., D. A. Hendrickson, F. J. Abarca, and S. Hart. 1991. Status of the Sonoran topminnow (*Poeciliopsis occidentalis*) and desert pupfish (*Cyprinodon macularius*) in Arizona. Arizona Game and Fish Department, Special Report on Project E5-2, Job 9, Title VI of the Endangered Species Act, Phoenix.

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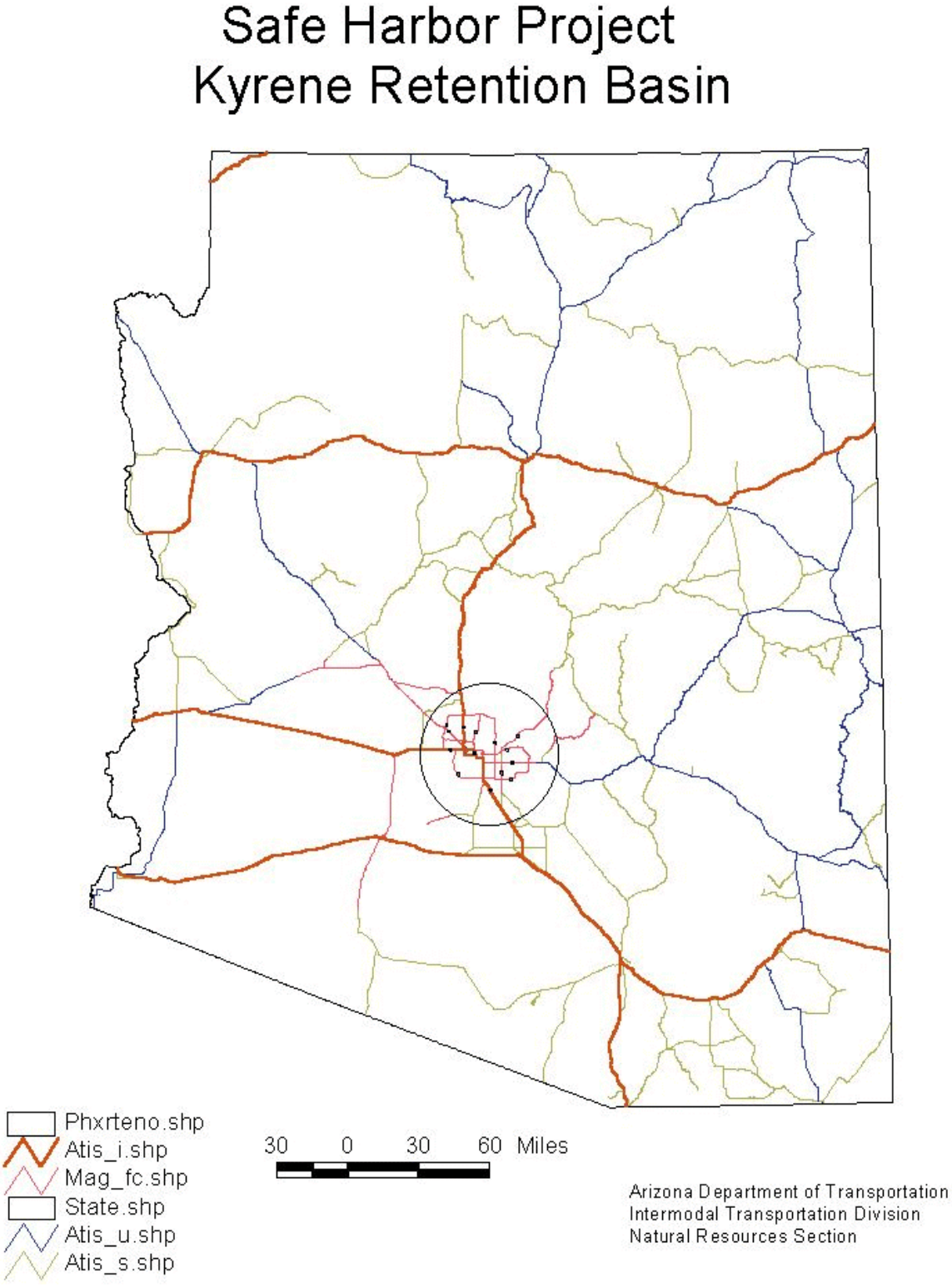
Soderberg, R. W., J. W. Meade, and L. A. Redell. 1993. Growth, survival, and food conversion of Atlantic salmon reared at four different densities with common water quality. Progressive Fish-Culturist 55:29-31.

U.S. Fish and Wildlife Service. 1993. Desert pupfish recovery plan. USDI Fish and Wildlife Service, Albuquerque.

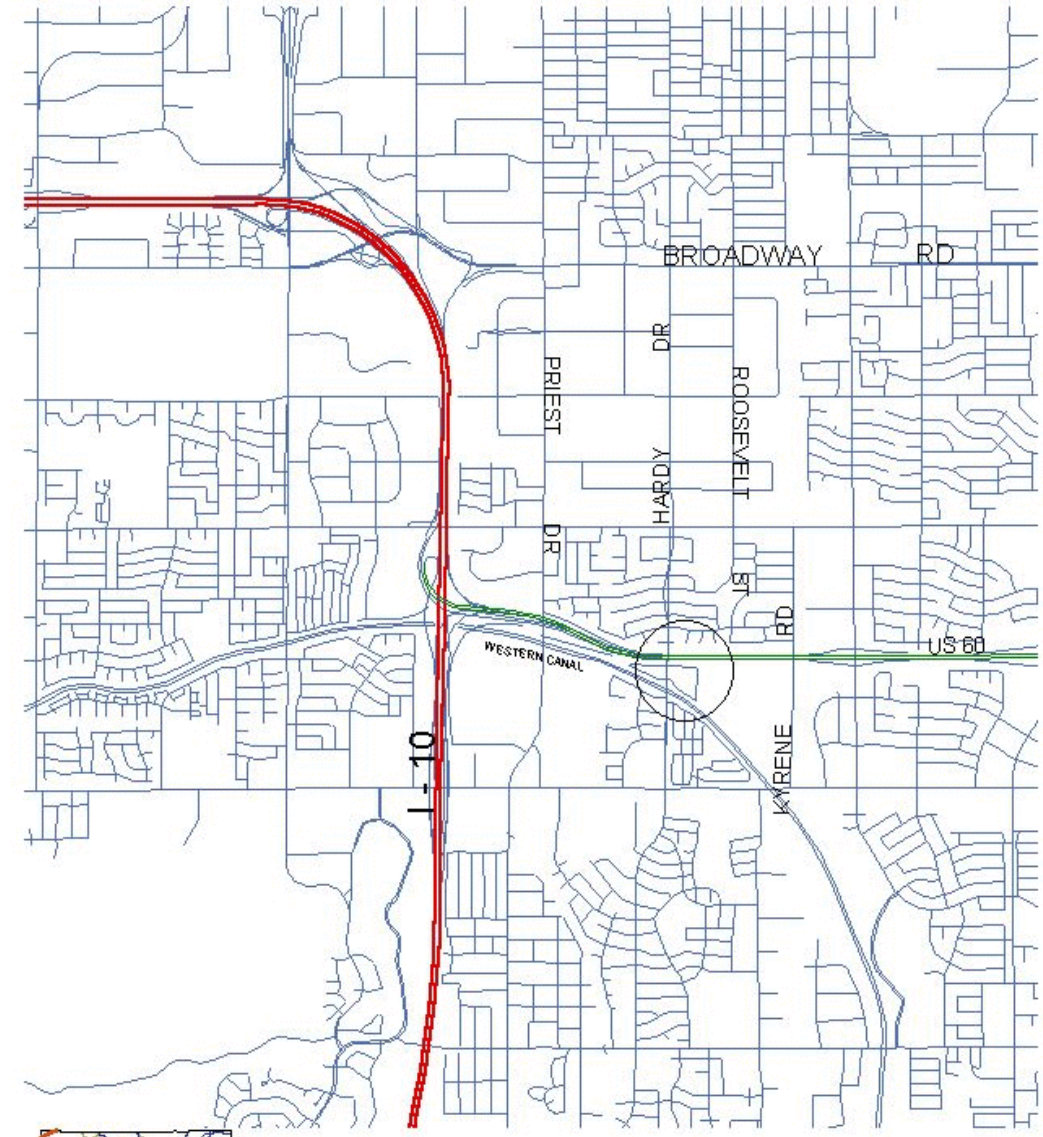
Weedman, D. A. 1998. Draft Gila Topminnow revised recovery plan. USDI Fish and Wildlife Service, Albuquerque.

___, and K. L. Young. 1996. Gila topminnow sites in Arizona: provisional extirpation report 1995-96 field season. Arizona Game and Fish Department, Technical Report 100, Phoenix.

APPENDIX 1 – MAPS OF SITE LOCATION

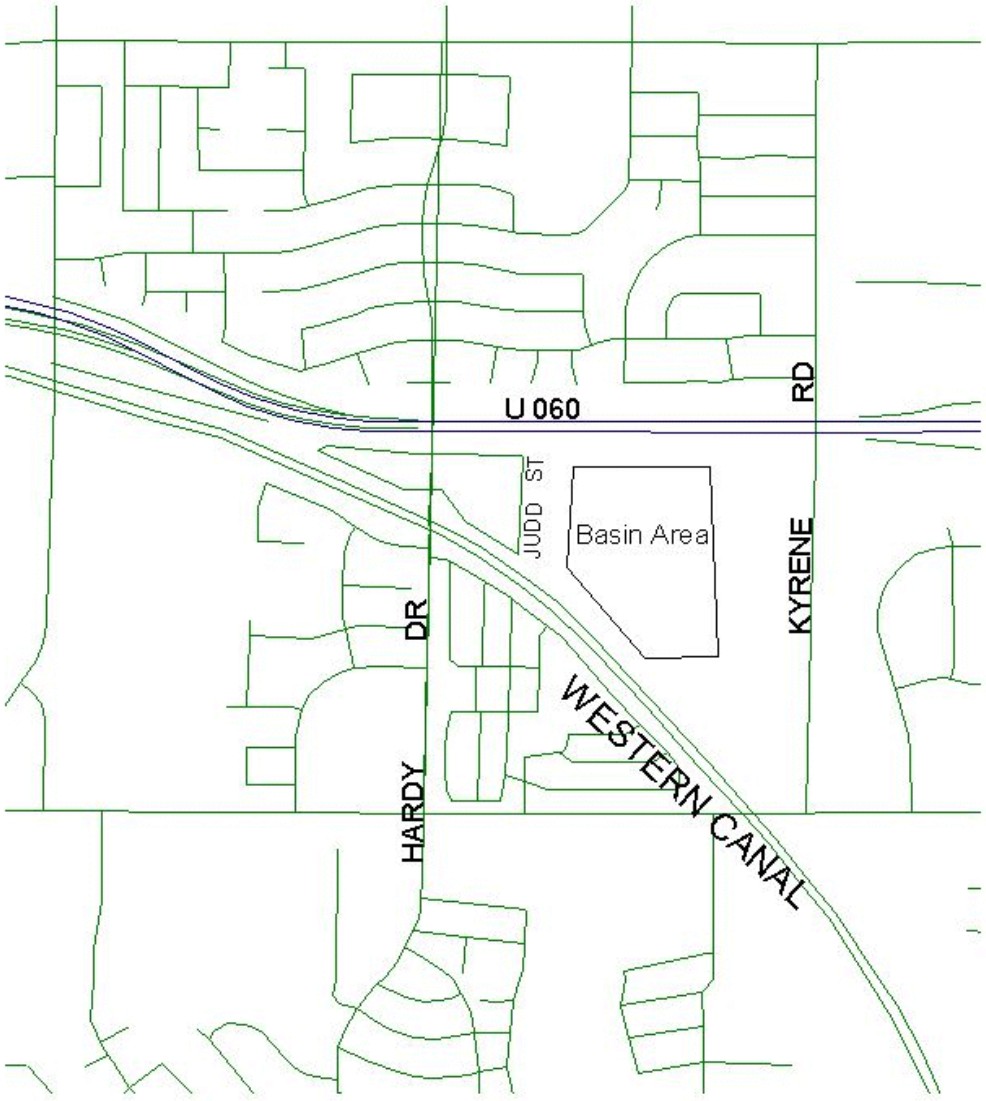


Safe Harbor Project
Tempe, Arizona



Arizona Department of Transportation
Intermodal Transportation Division
Natural Resources Section
March, 2000

Safe Harbor Project
Arizona Department of Transportation
Tempe, Arizona



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